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the work was attempted by Peter the Great, but at the end of a year, after his defeat at Narva, Peter abandoned the project, which has since that time been periodically discussed. In October last M. Léon Dru, a French engineer, having surveyed a line, was convinced that the project was practicable, and experimental borings have already commenced.

A ruined city found in Asia Minor. — In the province of Adana, Asia Minor, not far from Tarsus, at a few hours' travel from the sea, among the mountains, has recently been discovered a ruined town hitherto entirely unknown. The ruins lie near the route from Sélef-Ké to Karaman by Mohara. Sarcophagi almost intact, and resembling those of Lycia, exist there, and would seem worthy of study.

Monuments of Babylonian times. — It is stated that an archeological expedition, under Professor Niemann of the Academy of fine arts, is fitting out in Vienna for the exploration of those parts of Taurus and Anti-Taurus where last year were found remains of monuments dating from Babylonian times.

Siberian interest in geographical exploration. — An exploration, to cover a period of five years, is being organized by Yadrintseff, under the auspices of the Russian geographical society. Its purpose is the investigation of the ethnology and social economy of Siberia. The party will consist of young men, who will be distributed over different parts of that immense region for purposes of study. Residents of Siberia have already manifested a laudable interest in such investigations; and beside museums at Irkutsk, Omsk, Yeniseisk, and Tomsk, M. Martianoff, at Menusinsk, in the Yenisei government, has already gathered a collection of more than six thousand archeological and ethnological specimens.

The trans-Siberian railway. — The trans-Siberian railway has already finished its first section of 135 kilometres between Ekaterinburg and Kamishoff, and its early completion to Tiumen is confidently expected. The canal between the Obi and the Yenisei is already so advanced that navigation will probably be inaugurated on it by the spring of 1887, if not even earlier. Sibiriakoff has established a line of steamers on the Angara, which unites Lake Baikal to the Yenisei, and which has been thought too turbulent for navigation.

The old bed of the Oxus. — Daniloff, in examining the Oxus, has found what he reports to be the point of its ancient bifurcation into the Amu Daria and the Uzboi. In opposition to the opinion of M. Lessar, chronicled in these pages, but confirming that of Kalitine, Daniloff believes that the

latter is right in his mapping of an ancient river-bed in the desert, called the Uzboi or Unguz. This will soon be levelled throughout its extent, and the conflict of opinion be settled by the more exact methods of a careful survey.

ASTRONOMICAL NOTES.

Equatorial currents in solar and planetary atmospheres. — Of the bodies of the solar system, the sun, Jupiter, and the earth are the only ones that have thus far distinctly shown any decided difference of rotation-period, either for different parts of their visible cloud-surfaces, or for a gaseous atmosphere and the solid or cloud-surface above which it sweeps. Of these, Jupiter offers by far the greatest variety of detail, but it has never been adequately observed until the sudden appearance of the 'great red spot' in 1878 attracted universal attention to the planet. The result has been, that not only has this red spot, which is still visible, been shown to have a definite and nearly constant rotation-period, not varying many seconds from $9^h 55^m 37^s$, but certain white spots upon equatorial belts are found to be permanent features for several years in succession, and to have a rotation-period (about $9^h 50^m 10^s$) decidedly shorter than that of the red spot, but equally constant; so that their conjunction-times, as they sweep by each other, can be predicted pretty accurately. Detailed micrometric work upon these spots and belts, like that described in Professor Hough's annual reports, is especially valuable, and there is plenty of work still to be done upon the other details of the planet's cloud-surface. As to the sun, it is well known that the spots give a rotation-period of about 25 days for the solar equator, slowing up to about 27.5 days at latitudes of 45° , beyond which there are not sufficient data for fixing any period. But we think hardly sufficient attention has been paid to the fact that Professor Young's observations (*Amer. Journ. sc.*, 3d ser., xii. 321) upon the displacement of lines in the spectra from the east and west limbs of the sun gave for the equatorial velocity of the chromosphere $1.42 \pm .035$ miles per second, while the equatorial sunspot-period gives only 1.25 miles for the photosphere. It is a pretty strong indication that the solar atmosphere sweeps forward over the photosphere; and its bearing upon the probable behavior of the corona and meteoric matter falling into the sun would seem to call for a redetermination of this line-displacement with the more powerful dispersion now available in Rowland's gratings. As to the earth, we know that the general drift of the lower atmospheric currents is eastward, rotating faster than the globe itself; but of the circulation high up above the clouds we knew absolutely nothing until the red

sunsets following the Krakatoa outburst (whose explosion of 1883, Aug. 27, drove whole cubic miles of dust and steam, if not clear through our atmosphere, at least many times higher than the clouds ever float) indicated by their successive appearances at different places a probable upper equatorial current moving rapidly westward, i.e., rotating slower than the earth. We do not think the discussion of these red sunsets is, from this stand-point, by any means exhausted, and hope that Professor Kiessling of Hamburg, who has so well explained the physical causes of the phenomena, will publish the thousand or more records he has of the first appearances of the red sunsets all over the world. The only other occasions when these upper currents can be observed are the rare chances when the drift of a long-continuing meteor-streak might be determined from two or more observatories. If workers with equatorials would endeavor, on those rare occasions when a meteor-train remains visible, quickly to begin a series of pointings (using the lowest power) alternately upon the two ends of the streak, noting the times and reading the hour and declination-circles as rapidly as possible, we might in time accumulate some valuable data about the upper currents in our latitudes; but observatories near the equator are scarce. However, the knowledge thus gained of the heights at which meteors appear would be much more accurate than from the ordinary alignment among the stars, and these observations ought to be made on every possible occasion by astronomers.

Two new comets.—Two new comets have already been discovered during the present month. The first was found on Dec. 1, at Paris, the name of the discoverer not being given in the telegram. The comet was readily picked up by Professor Frisby of the Naval observatory with a 2 $\frac{3}{4}$ -inch finder, and the following observations were obtained with a 9.6-inch equatorial:—

Date.	Wash.M.T	α	$\log p. \Delta$	δ	$\log p. \Delta$
1885.					
Dec. 2	9h 20m 2s	0h 36m 11s.11	9.285	+21° 0' 20".2	0.460
" 3	8 10 56	33 53.93	8.796	20 58 46 .7	0.433
" 6	6 27 6	27 7.81	9.679 n	20 54 3 .5	0.443
" 7	6 58 54	24 50.81	8.593 n	20 52 35 .7	0.434

It has been described as ill-defined, and slightly condensed towards the centre,—without a tail. The second comet is announced in a telegram from Prof. Lewis Swift, who states that the comet was discovered by Mr. E. E. Barnard of Nashville, Tenn., on Dec. 3, its position being at 9h 37m (probably Washington mean time) R.A., 4h 21m 57s; Dec., +4° 45'. The motion is given as 35 minutes, but the direction of the motion is made unintelligible by the ambiguous term 'north west.'

In the position just given, the comet would pass the meridian a few minutes before the bright star Aldebaran, but nearly twelve degrees farther south.

NOTES AND NEWS.

THE work of the Henry Shaw school of botany, St. Louis, outside of the university classes, will begin with the formation of a class for the study of grasses. For the accommodation of teachers in the schools of the city, this class will meet from 9 to 1, on Saturday mornings. A class in analytical botany will take up the study of spring flowers on Tuesday and Thursday afternoons, and Saturday mornings, from April 6 till June 12, 1886.

—Those interested in composite photographs will find a plate of four of members of the National academy, in *Science* of May 8, 1885; another, from a composite photograph of several skulls, in the number for June 19; a third, of the officers of the American association at the Philadelphia meeting, in the issue of Aug. 28; and a fourth, showing the racial characteristics of Jews, in *Science* of Oct. 9.

LETTERS TO THE EDITOR.

. Correspondents are requested to be as brief as possible. The writers' name is in all cases required as proof of good faith.

Newcomb's 'Political economy.'

PROFESSOR NEWCOMB objects, in the last number of *Science*, to certain things in my recent notice of his work on political economy, charging me with 'atrocious misrepresentation' of his views. The quotation-marks enclosing two sentences in the first paragraph of my review should not have been there, and, so far as they led my readers to think that they indicated Professor Newcomb's own words, they were misleading; and an apology is due Professor Newcomb from me, which is hereby tendered. I may simply say, by way of explanation, that the proof of my article was not submitted to me in time to receive any corrections at my hands before it was printed, or the offending marks, as well as the word *always*, to which the author objects later in his letter, would certainly have been expunged.

As to the chief point at issue, however, viz., whether my article presented a correct view of Professor Newcomb's theories, I have nothing to take back or change. I have again examined Professor Newcomb's book, in connection with his strictures on my review, and do not see wherein I have misrepresented him. The point in dispute, of course, is not what Professor Newcomb desired or tried to do, nor even what he claims to have done, but simply what he actually did do in the work reviewed. It is true that he expressly disclaims any intention of doing what I maintain he has done; but this is no evidence, of course, that my view of his actual work is erroneous. The notice contained my opinion of the real work, and not of the author's